HYDRAULIC IMPULSE GENERATOR AND FREQUENCY SWEEP MECHANISM FOR BOREHOLE APPLICATIONS

Abstract of the Disclosure

This invention discloses a valve that generates a hydraulic negative pressure pulse and a frequency modulator for the creation of a powerful, broadband swept impulse seismic signal at the drill bit during drilling operations. The signal can be received at monitoring points on the surface or underground locations using geophones. The time required for the seismic signal to travel from the source to the receiver directly and via reflections is used to calculate seismic velocity and other formation properties near the source and between the source and receiver. This information can be used for vertical seismic profiling of formations drilled, to check the location of the bit, or to detect the presence of abnormal pore pressure ahead of the bit. The hydraulic negative pressure pulse can also be used to enhance drilling and production of wells.